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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/670,820	09/28/2000	Atsushi Shimonaka	0717-0446P	8768

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EXAMINER

LANDAU, MATTHEW C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/670,820

Applicant(s)

SHIMONAKA, ATSUSHI

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-14 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,9-14 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 10-13 and 20-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regards to claim 10, the limitation “and additionally comprising, an input waveguide region...” renders the claim indefinite. It is unclear if the input waveguide region of claim 10 is the same as the input waveguide region of claim 1. It is suggested the claim be rewritten as follows: “A semiconductor laser element according to claim 1, wherein [and additionally comprising,] the [an] input waveguide region located between the semiconductor laser region and the interference region[, and including] includes”

In regards to claim 28, the limitation "the laser emission portions" and “said laser emission portions”. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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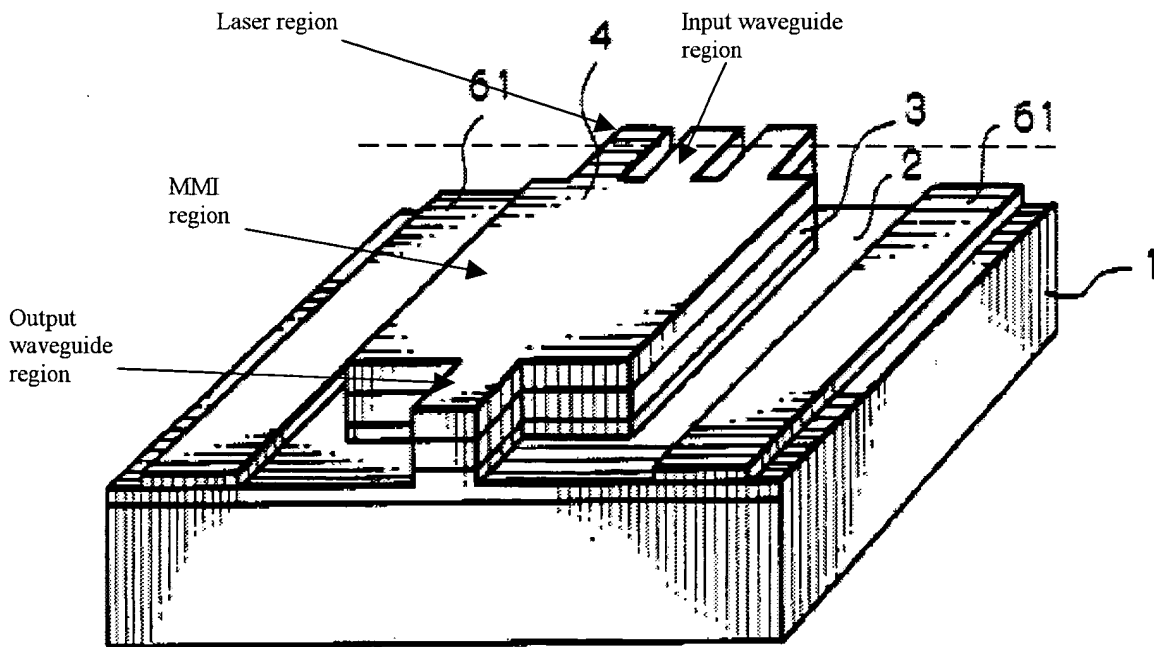
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 9-12, 21, 23-26, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Hamamoto (US Pat. 6,205,163).

In regards to claim 1, Figures 6 and 8 of Hamamoto disclose a semiconductor laser element, comprising: a semiconductor laser region including a plurality of laser emission portions (the three protruding portions at the top of Figure 6) each having the same construction relative to one another and arranged side by side in a parallel array, each of said laser emission portions including an active layer 3 for emitting light; a multimode interference (MMI) region (middle region) including a first wave guiding layer 3; an input waveguide region located between the semiconductor laser region and the multimode interference region, said input waveguide region including a plurality of wave-guiding portions (the three protruding portions) where all the wave-guiding portions are equal length in an optical direction; and an output waveguide region (single protruding portion at the bottom of Figure 6) including a second wave-guiding layer 3, the second wave-guiding layer being optically coupled to an opposite end of the first wave-guiding layer of the interference region. As can be seen from Figures 4 and 5, Hamamoto discloses that the entire device is made from the same layers. Layer 3 functions as both an active layer and a waveguide layer. Furthermore, an electrode 7 covers all sections. Therefore, the three protruding portions at the top, the MMI region, and the single protruding portion at the bottom can be considered both laser regions and waveguide regions. Applicant has not claimed any structural difference between the laser region (laser emission portions) and the

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input waveguide region (wave-guiding portions). Therefore, it is considered by the Examiner that the top halves of the three protruding portions are the laser emission portions while the bottom halves are the wave-guiding portions. The following figure is provided for clarification. The dotted line represents the junction between the laser region and the input waveguide region.



In regards to claim 3, Figures 6 and 8 of Hamamoto disclose the semiconductor laser region, the multimode interference region, and the output waveguide region are provided on a same semiconductor substrate 1.

In regards to claim 4, Figure 8 of Hamamoto discloses a first electrode 8 provided on a lower surface of the semiconductor substrate; and a second electrode 7 provided at least on an upper surface of the semiconductor laser region.

In regards to claims 9 and 11, Figure 6 of Hamamoto discloses the active layer of the plurality of laser emission portions (active layers), the first wave-guiding layer of the multimode interference region, the plurality of third wave-guiding layers, and the second wave-guiding layer of the output waveguide region are integrally formed of a same type of semiconductor material (InGaAsP) (col. 3, lines 10-16).

In regards to claim 10, Figures 6 and 8 of Hamamoto disclose the input waveguide region includes a plurality of mutually spaced apart substantially equal length third wave-guiding layers 3 for optically coupling the active layers of the plurality of laser emission portions and the first wave-guiding layer of the MMI region.

In regards to claim 12, Hamamoto discloses the first wave-guiding layer and the plurality of third wave-guiding layers are comprised of a low optical absorption material (InGaAsP) (col. 3, lines 10-16).

In regards to claim 28, Figures 6 and 8 of Hamamoto disclose a semiconductor laser element comprising: a semiconductor laser region including a plurality of laser oscillation portions (the three protruding portions at the top of Figure 6) each having the same construction relative to one another, arranged side by side, and having a common modulation electrode 7 traversing all of the laser emission portions for operating said laser emission portions in a single mode (col. 2, lines 53-55), each of said laser oscillation portions having an active layer 3 which performs laser operations at a same wavelength (col. 3, lines 10-16); a MMI region (middle region) including a first wave-guiding layer 3 coupled to said laser oscillation portions via an input waveguide region (three protruding portions) including a plurality of parallel equal length waveguides having respective second wave-guiding layers 3 where all the waveguides are equal

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length in an optical direction; an output waveguide region (single protruding portion at bottom of Figure 6) including a third wave-guiding layer 3 coupled to said second wave-guiding layers; wherein the active layer 3 of the plurality of laser oscillation portions, the first wave-guiding layer of said MMI region, the second wave-guiding layers 3 of the input waveguide region, and the third wave-guiding layers 3 of the output waveguide region are formed on a common substrate 1 (col. 3, lines 10-16). The interpretation used in this rejection is the same as that used in the rejection of claim 1.

In regards to claim 21, Figure 6 of Hamamoto discloses the first wave-guiding layer 3 and the plurality of second wave-guiding layers are comprised of the same material (InGaAsP) having low light absorption (col. 3, lines 10-16).

In regards to claims 23-25, it is inherent that the second wave-guiding layers of Hamamoto's input waveguide region have a predetermined equivalent refractive index and a predetermined width. The width of an end product cannot be compared to an imaginary, intended value. Thus, the manufacturing accuracy with respect to the predetermined width does not patentably distinguish the claimed invention over Hamamoto.

In regards to claim 26, the product by process limitation "wherein the geometric pattern of the plurality of second wave-guiding layers is made by a reduction exposure method" does not patentably distinguish the claimed invention over Hamamoto.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto in view Towe et al. (US Pat. 4,827,482, hereinafter Towe).

In regards to claims 13 and 22, the difference between Hamamoto and the claimed invention is the first wave-guiding layer, the third wave-guiding layers, and the plurality of second wave-guiding layers are made of AlGaAs. Figure 3a of Towe et al. discloses wave-guiding layers 16' formed of AlGaAs. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Hamamoto by making the layer 3 (which includes the active layers, the first wave-guiding layer, the third wave-guiding layers, and the plurality of second wave-guiding layers) from AlGaAs. The ordinary artisan would have been motivated to modify Hamamoto in the manner described above for the at least the purpose of selecting a semiconductor material that generates a shorter wavelength of light.

Claims 14 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamamoto in view of Mazed.

In regards claims 14 and 27, the difference between Hamamoto and the claimed invention is an electronic device that supplies a modulation signal to the semiconductor laser element.

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Mazed discloses a laser chip 10 with a modulation signal applied thereto (see column 16, lines 61-65). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Hamamoto by incorporating an electronic device that supplies a modulation signal to the semiconductor laser element for the purpose of adjusting the laser output.

Allowable Subject Matter

Claim 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 1 and 28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Matthew C. Landau

Examiner

March 22, 2004


JEROME JACKSON
EXAMINER